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# USSR Report

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15 May 1984

# USSR REPORT

## ENERGY

### CONTENTS

#### FUELS

#### OIL AND GAS

Gas Industry Socialist Commitments Discussed (SOTSIALISTICHESKAYA INDUSTRIYA, 7 Feb 84) .....	1
Achievements, Problems of Udmurtiya's Oil Exploration Program (I. Artemchuk; EKONOMICHESKAYA GAZETA, No 7, Feb 84) ..	3
Tyumen's Long Range Development Plans Discussed (V. Kuramin; SOVETSKAYA ROSSIYA, 23 Mar 84) .....	5
Officials Chastised for Oil Refinery Mismanagement (SOTSIALISTICHESKAYA INDUSTRIYA, 8 Mar 84) .....	9
West Kazakhstan Oil, Gas Deposits Discussed (R. Sh. Kudashev; STROITEL'STVO TRUBOPROVODOV, No 1, Jan 84) .....	11
Development of Tengiz Oil Deposit (A. S. Gelagayev, V. V. Shevtsov; STROITEL'STVO TRUBOPROVODOV, No 1, Jan 84) .....	14
'Advantages' of Using Hydrocyclones in Oil Extraction Work (S. Tenengol'ts; VYSHKA, 6 Jan 84) .....	17
Importance of Future Prospecting, Exploration Work (V. Venkov, et al.; SOTSIALISTICHESKOYE INDUSTRIYA, 24 Jan 84) .....	20
Caspian Shelf Oil Prospecting Ship Described (A. Gol'denberg; VYSHKA, 13 Dec 83) .....	22

## Briefs

Earth's Heat as Fuel	24
New Tyumen Oil Deposit Named	24
Construction Project Progress	25
Kazakh Gasification Chairman Appointment	25
Uzbekistan Industry Natural Gas	25
Azerbaijan Gas Price Cuts	25
Borehole Procedures in Turkmeniya	26
Siberian Wells Reactivated	26
Forest Tundra Oil Gusher	26
Gas Products in Ukraine	26
Deep Drilling in Poltava	27
New Caspian Oil Deposit	27
Caspian Offshore Drilling Progress	27
Tyumen Wells Operating Successfully	27
Versatile New Lebedyan Pumps	28
Chimkent Pumping Station Construction	28
Tatar Oil Workers' Success	28
Krasnovodsk Refinery Distillation Unit	29

## COAL

Problems With Ekibastuz Coal Supply Noted (O. Qaliyev; SOTSIALISTIK QAZAQSTAN, 19 Oct 83) .....	30
--	----

## ELECTRIC POWER

### NON-NUCLEAR POWER

Prospects for Development of Tidal Electric Power Stations (PRAVDA, 17 Dec 83) .....	31
Effective Management Maximizes Production at Zaporozhye GRES (V. Cherkasov; PRAVDA, 11 Dec 83) .....	33

## Briefs

Primorskaya GRES Gets Unit	35
Stavropol'skaya GRES Is Completed	35
Tashkent Pipeline Begins Operation	35
Unit Three for Azerbaijan GRES	35
Karmanovo GRES Runs on Gas	36
New Coal Transport Gallery	36
Neryungri GRES Start-Up	36

## PIPELINES

### COMPRESSOR STATIONS

Construction Completed at Algasovsk Station (MOSKOVSKAYA PRAVDA, 5 Jan 84) .....	37
---	----

GENERAL

Offshore Settlement Planning Reviewed

(O. A. Shchetnev, M. R. Ovchiyan; AZERBAYDZHANSKOYE

NEFTYANOYE KHOZYAYSTVO, No 12, Dec 83) ..... 39

## OIL AND GAS

### GAS INDUSTRY SOCIALIST COMMITMENTS DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Feb 84 p 1

[Unattributed article: "Socialist Obligations"]

[Text] Putting into Practice the resolutions of the 26th Party Congress and the subsequent CPSU Central Committee plenums, the workers in the gas industry fulfilled ahead of schedule the plans for 1983 and three years of the five-year plan for gas extraction, labor productivity and other technical-economic indicators. In the past year the national economy received 5.7 billion cubic meters of gas above the fixed assignment. The gas pipeline Urengoy-Pomary-Uzhgorod was put into operation at the fixed capacity.

Guided by the resolutions of the December (1983) CPSU Central Committee Plenum, and by the assumptions and conclusions contained in the speech of CPSU Central Committee General Secretary Comrade Yu.V. Andropov, the workers in the sector have widely developed socialist competition, striving to make a worthy contribution to the development of the country's fuel and energy system, and in 1984 took on the following commitments:

By virtue of accelerated development of the Urengoy and other gas deposits, more efficient use of the existing capacities in extracting, processing and transporting gas, wide-scale introduction of comprehensive mechanization and automation of the gas fields and gas transport systems, reinforcing socialist labor discipline and improving production management, to complete fulfillment of the state plan for gas extraction on 29 December and to give 3.8 billion cubic meters of this type of fuel and raw material over the assignment. To achieve the utmost yearly increase in gas extraction amounting to 46 billion cubic meters, in developing the gas industry.

To overfulfill the assignment for labor productivity growth by 1 percent and to reduce, as against the plan, input for production output by 0.6 percent and obtain above-plan profits amounting to 50 million rubles.

To increase the efficiency and quality of drilling wells and increase the rate of drilling by 5 percent as against the fixed assignment.

To ensure further development and heighten the reliability of the country's unified gas supply system, and put into operation, earlier than the established deadline the linear section of the main gas pipeline Urengoy-Center-1. To

construct ahead of schedule the gas pipeline branches to major electric power stations, with a total extent of about 500 kilometers, which will make it possible to save 6 million tons of mazut a year for the national economy.

To disseminate on a broad scale the experience of leading collectives in saving raw material and other material resources, and to save 400 million kilowatt-hours of electric and 450,000 gigacalories of thermal energy, 1000 tons of metal, 2300 tons of casing and drill pipes, at least 2300 tons of turbine oil and 940 tons of chemical reagents. To ensure transporting of all above-plan gas on the basis of the energy resources saved.

Due to introducing measures for new equipment and technology, to obtain an economic effect in addition to the plan in the amount of 15 million rubles. To develop new types of highly efficient gas pumping assemblies with a heightened unit capacity and to introduce, above the established assignment, five automated control systems for industrial processes. To increase the creative activity of the innovators and inventors and obtain from putting their suggestions into operation an economic effect of not less than 65 billion rubles.

To increase, as against the plan, the production of goods for cultural and everyday and household purposes by 1 million rubles. To produce 500,000 household gas stoves of the highest-quality category.

With a view to improving social and everyday living conditions for the sector's workers, to put into operation 920,000 square meters of overall area for apartment houses, children's preschool institutions for 5000 places, general education schools for 5500 students, hospitals for 450 beds, polyclinics for 420 visits a shift and sanatoriums and dispensaries for 480 spaces. To train for new occupations at least 27,000, and to raise the qualifications of 67,000 workers.

In the sector's subsidiary operations, to increase, as compared with the preceding year, the production of meat by 4 percent, of milk by 6 percent, of vegetables by 1.3-fold and grain 1.2-fold.

The workers in the gas industry, considering unfailing fulfillment of the planned goals and conscientious highly productive labor to be their patriotic duty, assure the Leninist CPSU Central Committee that they will successfully fulfill the plan for 1984 and the five-year plan as a whole and will make a worthy contribution to implementing the USSR Power Engineering Program.

The commitment was adopted at general meetings of the collectives of the enterprises and organizations and was approved by the Board of the Ministry of the Gas Industry and the Presidium of the Central Committee of the Trade Union of workers in the oil and gas industry.

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## OIL AND GAS

### ACHIEVEMENTS, PROBLEMS OF UDMURTIYA'S OIL EXPLORATION PROGRAM

Moscow EKONOMICHESKAYA GAZETA in Russian No 7, Feb 84 p 6

[Article by I. Artemchuk, candidate of economic sciences, Izhevsk-Moscow: "At the Oil Fields of Udmurtiya"]

[Text] In January an additional eight thousand tons of oil was extracted from Udmurtiya's wells, amounting to one-fifth of the supplementary yield envisaged in the Udmurtneft' Association's alternative plan for 1984. The month's targets to increase labor productivity and reduce drilling and extracting costs have been over-fulfilled. Nevertheless, not all reserves were activated.

Petroleum extraction in the Udmurt ASSR began relatively recently--some fifteen years ago. In 1973 the Udmurtneft's Production Association was founded, and today more than thirty oil drilling, transport and construction different enterprises and organizations are its members.

Udmurtiya's oil industry is developing at a rapid pace. It suffices to say that over the last decade oil extraction in this region increased by a factor of 5 and was in excess of 9.2 million tons in 1983. During this period drilling operations have increased by a factor of more than 4.3 times. These achievements became possible thanks to uncovering and maximum use of internal production reserves and effectively utilizing the extensive experience of Udmurtiya's neighbors--the oilmen of Tataria, Bashkiria, Kuybyshev and Orenburg.

Udmurt oil is not easily obtained. Complex geological conditions, high oil viscosity, and a large content of tars, paraffin and their compounds require painstaking preparation of the extraction technology, proper selection of means and methods for preparing bottomholes, frequent equipment changes, and extraordinary efficiency of brigades doing underground maintenance or well overhaul.

The latest achievements of science and technology are used in developing petroleum deposits. This includes flooding the reservoirs and increasing the density of wells, and injecting steam or water thickened with polymers into



the stratum, enabling a high proportion of oil to be recovered. Under the conditions of high-viscosity oils, new methods of stimulating deposits must be tested and adopted by injection of various chemical reagents. The problem of fighting paraffin, salts and tar deposits in pipes and operating equipment remains urgent. In solving these problems the assistance of the Petroleum Industry Ministry and its scientific research institutes can and should be appreciable.

The territory of Udmurtiya is considered promising for the discovery of new oil deposits. All the same, during recent years the tempo of oil extraction growth has slowed down somewhat in this rayon.

One of the reasons for this is the delays by RSFSR Geology Ministry's Udmurtgeologiya Association on dates to put explored deposits into operation. At the Prikamskoye, Lozolyuk-Zurinskoye, Zotovskoye, Yeseneyskoye and a number of other sites, geologic exploratory work has been going on for more than eight to ten years instead of the accepted standard of four to five years. Geologists are spreading their efforts over too many areas. Because of the small drilling volume, the oil content of Udmurtiya's western regions and deep strata has been poorly studied. In the republic as a whole, average exploratory drilling capacity per square kilometer is three times less than in the Tatar ASSR and 3.5 times less than in Kuybyshev Oblast.

In order to assure that crude production levels set by the 11th Five-Year Plan will be attained, the Udmurtneft' Association must bring seven new deposits into operation. As a result of unsatisfactory construction progress for three years, only two of them have been handed over. The Ministry for Oil and Gas Construction is conducting work on installations at a number of oil fields extremely slowly. A disproportion has developed between the rates of growth in oil-drilling capacities and the volume of completed construction work; this, in turn, leads to idle time for the wells.

Tatneftestroy Association, to which the Udmurtneftegazstroy is subordinated, does not give requisite attention to developing its own construction work and with supplying technology and materials to building projects.

Responding with action to the decisions of the December (1983) CPSU Central Committee Plenum, Udmurtiya oil-worker collectives pledged themselves to deliver 40,000 tons of crude in excess of five-year plan targets for 1984 and to bring an additional 15 oil wells into operation. On the basis of proved organization of work and automation of production processes, an 11 percent reduction, compared to 1983, is envisaged for specific labor outlays to service a single well. Measures were outlined to save materials and fuel-energy resources.

January totals have shown that the teams headed by P. Shirobokov of the Igrinskoye NGDU and V. Shkalikov of the Votkinskoye NGDU, as well as many other collectives, were well prepared to solve urgent problems in 1984. However, the rates of operations and the plan limits themselves, and consequently obligations themselves could have been higher in the presence of a clear operations program for the future.

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## OIL AND GAS

### TYUMEN'S LONG RANGE DEVELOPMENT PLANS DISCUSSED

Moscow SOVETSKAYA ROSSIYA in Russian 23 Mar 84 p 2

[Article by V. Kuramin, deputy minister for oil and gas industry enterprise construction: "The Right-of-Way Puts Everyone to the Test"]

[Text] I often have to be in the oil-and-gas bearing regions of Tyumen Oblast. Each time I rejoice at how these areas, deserts until recently, were transformed before my eyes. In order to extract gas and oil here, cities, settlements, and thousands of kilometers of roads, power lines and pipelines have been built. Dozens of installations for oil and gas preparation and hundreds of other structures have appeared. And all this in truly difficult locations: in swamps, in permafrost, in the severest freezes or under a burning sun. During the 9th Five-Year Plan construction worth 2.6 billion rubles was carried out, while during the current one it will run to 11 billion!

Transformations on this scale in such short periods would have been unimaginable without new organizational forms and construction methods. Installation of pipelines, for example, involves use of spreads. As is known, this principle made it possible to reach a daily flow advance of one kilometer on the Urengoh-Pomary-Uzhgorod right-of-way. The complete prefab method became a powerful accelerator in surface construction. I'll remind you of its essence. Basic compressor and oil-pumping station units, and other engineering items are manufactured and partially equipped at plants in Tyumen, and then delivered to the northern regions. Then they need only be installed on site and switched on. It would seem that correct organizational decisions have been found. Perfect them and reap success. But yesterday's experience also needs to be developed. Now, for instance, oil recovery conditions in Western Siberia have changed sharply. In the preceding five-year plan period crude was yielded by several large deposits, but now dozens of small ones, located ever farther to the north, must be exploited. Each one has to be outfitted and this increases the volume of construction and installation work. In the coming five-year plan, such work will amount to 21 billion rubles. We have estimated our capacities and have found out that if we continue working with present-day methods in the future, then we shall unavoidably place oil and gas workers in a difficult position. Then what principles of construction organization shall we take with us on the road along which the development of the Western Siberia oil and gas complex is proceeding?

First of all, the trusts equipping main pipelines are intergrated. The methodology in the coming years will scarcely change in principle, but will be improved. Indeed, very significantly improved. Otherwise the daily rate of installing the pipelines cannot be increased to two or three kilometers per spread, yet this is precisely the task before us today. The special advantage of the spread method is its integration and the concentration of great resources--materials, technology, people. But what if suddenly some link fails, and Western Siberian conditions do not allow reserves to be transferred efficiently from other locations? Then losses are inevitable. Such break-downs occur at times because before the approach of the basic technological flow, no engineering preparation of the route is made beforehand. Moreover, there are many elements and sectors on the route where the engineering of laying the "pipe" is not all that simple; there are crossings over brooks, rivers and swamps, and under roads and other service lines.

The second weak spot in the existing organizational model is the haulage of hundreds of thousands of tons of pipe and freight to the right-of-way. The welding and insulating administrations remove pipes from racks and unload it on the right-of-way. It is obvious that in our conditions it is hard for them to produce a surplus of piping and overweights ahead of the moving spread. In addition, the motor vehicle base and road-building administration, which keeps winter roads 100 to 300 km long in operating condition, participate in the operation. Of course it is not simple to coordinate all these links. Hence it was decided to establish a new type of transport and building subdivision--modeled after the road-building administration. This organization will unify the links handling pipe and overweight haulage, and together with the administration for preliminary right-of-way engineering will be included in the integrated trusts, which will make their structure more reliable.

Organizational changes must also be made in surface construction. However, there are fewer experimentally verified proposals here. And at present we are merely mechanically increasing the number of trusts and main administrations. Here it is important to analyze the load on the primary links and bridges, and to eliminate the considerable volume of manual labor. But it seems to us that this problem will not be rapidly resolved; machine-building capacity must be expanded, since engineering equipment leave a lot to be desired.

An important reserve for rates and quality of our work is in back-up services for our construction bases. Traditions that have formed plus transport difficulties, inadequacies in local building material distribution --all have forced us to establish construction bases on the principle of full self-sufficiency in large regions. But despite considerable efforts, these bases are weak when compared to the programs of future five-year plans. In order to overcome the lack in their capacities, Minneftegazstroy in Western Siberia must complete billions of rubles worth of work in the next few years. In other words, enlarge its efforts four or five times over present ones. To those surprised by these figures, let me say that the relative expenditures of our Ministry on producing bases are less than those of Minenergo and Mintransstroy. However, we do understand that this is small comfort. Hopes that we can develop in a traditional way are hardly realistic.

Growth in just our fundamental program requires an increase in the number of our subdivisions by 160 percent during the next five-year plan period. Where can one find the personnel in today's demographic situation?

I assume that a solution must be sought not only in further accretions to construction industry centers in the region, but also by attracting services from other territories of the country and in the developing of a mobile organizational structure. In fact, the volume of capital investments in the country is stabilizing, but is growing noticeably in the north of Tyumen Oblast. But if that is so, building capacities in other regions are a reason for working in Western Siberia. What ought to be imported here, from our viewpoint? First of all, every form of metal structural elements and prefabricated buildings. One can no longer accept the fact that the capacities created in the USSR Ministry for Construction of Specialized Installations are not fully utilized. In addition, they are generally supplying the industrially developed areas of the country. Meanwhile, development sites have to set up amateurish enterprises. There's more. In purchasing equipment abroad, Minmontazhspestroy did not provide for the needs of northern regions, where its application would have brought the greatest benefit to the nation. As an example, protective buildings are designed for temperatures not below 40°. This restricts their application sharply.

Nor can one by-pass the thermal insulation problem with just a line. This also may seem a sort of specialized topic, but today it frequently determines the pace of labor productivity growth. Unfortunately, up to now the ministry that brings on-line principal projects is responsible for developing all constituent parts of the material and technical construction base. In this case, it is the Ministry of Oil and Gas Construction. Yet the Construction Materials Ministry is not required to drill for oil and gas. Too bad. The shifting of pipelines to permafrost regions and the future transport of cooled gas and heated oil, sharply increase the need for effective heat-insulating material. More than half a million cubic meters a year are needed for Urengoy alone. But to deliver materials in the shape they are produced today is the same as conveying air. Shipping costs can be reduced by switching to the manufacture of mineral wool slabs. Moreover, they do not require much labor in installing. The Building Materials Ministry today has everything for reorganization except the wish to take consumer needs into account. Nothing else will explain the fact why this ministry's enterprises are promoting third-class products. They will have to be shipped to Western Siberia until the time when the sector starts developing its own capacities locally. The more so, since raw material is available here in great plenty.

The possibilities of saving on both manpower and equipment by way of reorienting the ministries are considerable. In Western Siberia we propose establishing only those building industry enterprises the services of which are currently difficult or impossible to "import." This means large-panel housing construction, maintenance, operation, partial manufacture of special construction equipment, machinery and vehicles and their repair, including major overhauls. On the agenda is production of prefab package units and super-prefabs. These, in an aggregate with industrial-type buildings (it is

for them that framework steel and lightweight mounted panels with efficient heating are needed) serve as the basis for outfitting surface oil and gas industrial projects to the year 2000. Moreover, the composite system anticipates not only for the individual elements of these projects to be produced as a unit, but also the organization of all the newly-developed operations in the region.

Starting with the requirement that surface building sections under factory conditions be enlarged to a maximum degree, we are developing a special system of centers. The main one, serving the entire region, is in Tyumen. The subsidiary ones are at sites of intensified construction. The units delivered from the main base are outfitted within a radius of 250 to 300 kilometers, and if necessary minor repairs made. The model is good in every aspect, but it will not be able to work at full strength until the delivery problem of extra-large prefab units to the north is resolved. An experiment was carried out successfully more than a year ago: a unit weighing 400 tons was transported via air-cushion. But extended technology utilization depends on a supply of specialized materials and products. The task is beyond the power of our ministry alone. And no one has succeeded in getting the others interested for many years already. Incidentally, a reliable transport technology for extra-large prefabs--not dry-land towing--would facilitate a significant reduction of metal content. Installation of the super-unit center has just begun. It will go into operation in no less than two years. Yet its production is very much needed today. In our opinion, it should be possible to get the manufacture of specialized pontoons going at other national enterprises. Perhaps it could be in exchange for non-self-propelled barges.

Right now the Ministry is reviewing its part in the long-range development program for the oil and gas complex to the year 2000. The tasks facing us are strenuous, and the sector will spare no pains in fulfilling them. Nevertheless, complete and efficient fulfillment of the programs to install industrial projects, housing, cultural and service institutions will be possible only by directing here the efforts of many sectors from other regions of the country. Experience confirms this daily. In other words, drilling for oil and gas in Western Siberia has reached a stage at which the building industry can no longer be only local. It must be supplemented with well thought out measures on the scale of the nation's industry. This scale is already used in building housing and roads. The time has come to apply this promising approach energetically to the entire range of construction in Tyumen Oblast.

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## OIL AND GAS

### OFFICIALS CHASTISED FOR OIL REFINERY MISMANAGEMENT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Mar 84 p 2

[Article: "Prizes for Squandering," under the rubric: The Newspaper has Reported. What's the Follow-up?"]

[Text] At the Mendeleyev Oil Refinery (Yaroslav Oblast) people have been accustomed to large heat losses. This matter was discussed in the report "Prizes for...squandering" published 17 November 1983.

Official responses to this article were sent to the editor. Yu. Sivakov, deputy minister of the USSR oil refining and petrochemical industry, reported that a special Minneftekhimprom commission had checked the state of affairs with regard to the utilization of thermal energy at the Mendeleyev plant.

Yaroslavnefteorgsintez Association, with the participation of the VPO Soyuznefteorgsintex, has worked out measures for eliminating the existing shortcomings. Administrative and economic incentive have been adopted against the persons responsible for allowing negligence and lack of discipline in organizing control and accounting for the expending of thermal energy.

The article was discussed at a meeting of the Tutayev Rayon Party Committee. The criticism was acknowledged to be just. The situation that had arisen, writes N. Karkhalev, CPSU raykom secretary, was the result of a serious lag of the energy branch in developing basic production, and also of inadequate demands from the plant party committee and the party raykom on operational managers.

V. Solopov, general director of Yaroslavnefteorgsintez, Production Association, reported on the measures taken in response to the article, in his official reply to the editor.

A reprimand to V. Ganuzin, the plant manager, for the infractions permitted was announced.

The facts described in the article were checked by agencies of the Yaroslav Oblast procurator's office. In the course of the investigation serious infractions and deficiencies were discovered in using fuel and energy

resources, writes oblast procurator K. Fedorenko. Agencies of the procurator's office sent an appropriate statement to the plant manager. The procurator's office also sent an information memorandum on this matter to party organs. As a result of its scrutiny, chief plant engineer Krivoshein, chief energy specialist Yartsev, and chief mechanic Smirnov were made strictly accountable to the party for not taking effective measures to remove the causes of the extravagance and mismanagement.

The questions raised in the publication were examined at the conference of party gorkom and raykom secretaries in the Yaroslav CPSS obkom. V. Gorulev, obkom secretary, reported on this.

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## OIL AND GAS

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### WEST KAZAKHSTAN OIL, GAS DEPOSITS DISCUSSED

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 1, Jan 84 pp 9-10

[Article by R. Sh. Kudashev (Glavneftegazstroy [Main Administration for the Construction of Enterprises of the Oil and Gas Production Industry]): "Development of the Western Kazakhstan Deposits"]

[Text] The oil- and gas-producing regions of Western Kazakhstan are of great importance to the development of the national economy. The advisability of accelerating the exploitation of western Kazakhstan's oil and gas deposits is to a large extent dictated by their geographic location--their closeness to oil and gas consumption and refining centers, and the presence of a network of transport and power connections.

The decisions of the 26th CPSU Congress call for stepping up geological-exploration work and accelerating the development of the oil and gas industry in western Kazakhstan.

Oil and gas production is to be increased out of the Zhanazhol, Tengiz, and Karachaganak deposits, the infrastructural development of which has been assigned to Glavneftegazstroy in the 11th Five-Year Plan.

Deposits like Zhanazhol and Tengiz, in which the extraction of oil entails the necessity of building units to recover hydrogen sulfide and produce sulfur--that is, chemical plants (the oil and gas in these deposits are characterized by a high hydrogen sulfide content), have not been developed in Soviet practice. Because of the absence of all-state normative documents (SNIps) governing the planning of oil-producing facilities and the infrastructural development of oil deposits whose casing-head gas contains 6 percent or more hydrogen sulfide, and because of the manufacture of fittings not designed to operate in abnormally corrosive media, the infrastructural development of the first phase of the Zhanazhol deposit has been designated as experimental-industrial.

Delivery, oil- and gas-collecting, and technology pipelines have been designed to be made out of low-alloy steel, with 100-percent inspection of all welded connections.

In the process of experimental-industrial exploitation of the first phase it is necessary to implement an integrated program of scientific-research work to study corrosive processes and select measures to protect components, also to study the anticorrosion material design of the equipment.



Work on the infrastructural development of the Zhanazhol deposit has been assigned to Orenburgneftegazstroy Trust, which has the job of putting the first phase into production, also that of building residential settlements and production and auxiliary bases at the site and in the city of Oktyabrsk and completing 16.5 million rubles' worth of construction-installation work in 2 years' time. Because of the sparse population of the region, organization of the infrastructural development work is based on the expedition-watch method.

Work experience in the infrastructural development of the Zhanazhol deposit in 1983 makes possible several generalizations.

A minimal volume of project-technological documents was drawn up by NIPIorgneftegazstroy [Scientific-Research and Project Planning Institute for Organization of the Construction of Oil and Gas Industry Enterprises] and the production preparations group of Orenburgneftegazstroy Trust.

In the construction process, units of Glavneftegazstroy encountered difficulties of both an objective and subjective nature.

The remoteness of the unloading station (200 kilometers away), the lack of roads in the springtime, snowdrifts in the winter, blowouts of hydrogen sulfide-containing gas and the down time caused by this, disruptions in the delivery of pipes and connecting components made of low-alloy steel, insufficient attention paid to automotive transport, and the lack of construction enterprises in the region--all these factors gave rise to certain difficulties in late 1983 during the concluding stage of the first phase.

The work was also complicated through the fault of Giprovostokneft' [State Research and Project-Planning Institute for the Oil Production Industry in the Eastern Regions of the USSR], which issued incomplete sets of documentation. A number of project decisions were taken in labor-intensive variants which needlessly complicated the construction. A 60-meter brick smokestack, cast-in-situ footings instead of drill-tamped [buronabivnyye], a great variety of standard sizes of footings for the equipment, and a needlessly material-intensive design of the overhead cable. Some of the structures were designed to be built of brick, requiring subsequent replacement by block-set structures. The project failed to include stipulations as to the technology of heat treatment of welded joints.

Because Sibkomplektmontazh Association was late in starting work on installation of the DYe-16-14GM boiler facility, difficulties arose in ensuring on-time start-up of the facilities of the first phase of the Zhanazhol deposit.

All these factors have entailed increased responsibility of Glavneftegazstroy's organizations for ensuring on-schedule start-up of the planned capacity of the first phase of the Zhanazhol deposit.

The Karachaganak gas-condensate deposit is characterized by high formation pressures, gas containing 3.5 percent hydrogen sulfide, solid paraffins in the gas and condensate, and a high condensate level.

The project-technology documentation for the construction was drawn up by NIPIorgneftegazstroy and the production preparations group of Orenburggazstroy. Infrastructural development of the Karachaganak deposit was assigned to Orenburggazstroy, which has experience in the development of the Orenburg gas condensate deposit.

Construction was delayed in 1983 because of disruptions in the delivery of connecting parts and fittings, LETSAR film, cathodic protection unit sections and RMM [?collapsible metal] buildings, trailer houses and individual panel-assembly houses, and KGSM-type boiler facilities to heat residential districts.

Construction-installation work worth 26 million rubles is to be completed in 1984. The complex gas treatment unit is to be turned over for start-up and adjustment work and the construction of the pipeline completed.

The experience gained in the infrastructural development of the Zhanazhol and Karachaganak deposits should be utilized in developing the Tengiz oil deposit, which is located in a remote, semi-desert region quite a distance from construction industry and supply bases. Considering that this deposit is more complicated in terms of engineering as well as climatic and geological conditions, the work should be started with prior construction of access roads, external utility lines, drinking water lines, temporary duty settlements, housing, and construction facilities. In the project documentation, maximum use should be made of ready-made structural designs, including block-set units which exclude nontechnological, labor-intensive processes.

In view of the fact that nontechnological project designs and organizational-technological shortcomings in the organization of construction give rise to considerable outlays of manual labor, it is essential to focus serious attention on the verification of the quality of the project documentation and to assign the drafting of project-technological documentation to NIPIorgneftegazstroy.

This will be the first experience in Soviet practice of the infrastructural development and exploitation of an oil deposit that is complicated in terms of engineering.

In view of the considerable volumes of construction involved in the region as a whole, including the infrastructural development of the Tengiz oil deposit, it is necessary to undertake the organization of construction industry bases and a general-contractor trust in Kulsary settlement, with plans calling for subsequent expansion in order to successfully develop the oil deposits of the Caspian Depression.

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DEVELOPMENT OF TENGIZ OIL DEPOSIT

Moscow STROITEL'STVO TRUBOPROVODOV in Russian No 1, Jan 84 pp 10-11

[Article by A. S. Gelagayev and V. V. Shevtsov, Mangyshlakneftegazstroy Trust, Novyy Uzen: "Tasks of the Infrastructural Development of the Tengiz Oil Deposit"]

[Text] A large volume of work is to be done by organizations of the Ministry of Construction of Oil and Gas Industry enterprises in the deposits of the Buzachi Peninsula in Mangyshlak Oblast and the newly developed Tengiz deposit in Guryev Oblast.

In order just to bring the first phase of the Tengiz oil deposit to the experimental-industrial exploitation level, the ministry's organizations will have to complete over 400 million rubles' worth of construction-installation work in the space of 6 years. In addition, it will be necessary to build oil and gas transport facilities, outside water supply lines, power supply units, and housing-community and social-cultural buildings.

Mangyshlakneftegazstroy, which has experience working the deposits on Buzachi Peninsula (which is located in the same natural-climatic conditions as the Tengiz deposit), has been designated the general contracting organization for the infrastructural development of the Tengiz deposit.

In order to implement priority tasks in regard to the infrastructural development of the new deposit it will be necessary to increase the productive capacity of the trust's construction organizations by 2.5 to 3 times. It will be necessary to work out a rational structure of administration and organization of the construction work, taking account of the characteristics of the region to be developed (with its lack of drinking water, roads, communications, and its complex natural and climatic conditions).

A prominent place among measures involved in the development of the Tengiz deposit must be assigned to development of construction service and construction industry bases. The bases which Mangyshlakneftegazstroy has were set up chiefly to support the infrastructural development of oil and gas deposits in the Novyy Uzen and Zhetybay settlement area, but the Tengiz deposit is 400 to 480 kilometers distant from these bases.

Sharp temperature differences (from -36 degrees in the winter to +50 degrees in the summer), the high dust content of the air, the lack of roads, and the

salinity of the soils require the organization of day-to-day services in the area where the work is proceeding and simultaneous organization of preventive repairs and maintenance in the regions already developed, for example the Mangyshlak settlement in Mangyshlak Oblast and the Kulsary settlement in Guryev Oblast. On the basis of work experience in Mangyshlak Oblast, it is also necessary to revise periodic maintenance norms and depreciation schedules for motor vehicles and construction machinery. Another complication is that of supplying the construction site with precast concrete and ferro-concrete structures and ready-mix concrete. Mangyshlak and Guryev oblasts lack industrial reserves of construction sand. And the raw materials available for the production of gravel in Mangyshlak Oblast need to be checked as to their suitability as concrete fillers. This must be taken into account when planning project-survey work. Data from the West Kazakh Exploration Administration show that industrial reserves of construction sand and gravel are available in Ural and Aktyubinsk oblasts.

Mangyshlakneftegazstroy Trust has collaborated with SibNIPigazstroy [Siberian Scientific Research and Project Design Institute for the Construction of Gas Industry Enterprises] on the preparation of proposals for the development of service bases for the construction organizations and construction industry in Mangyshlak and Guryev oblasts. It is essential that these proposals be examined and, as far as possible, taken into account in working out measures to develop the oil and gas industry in western Kazakhstan.

In working out project designs it is necessary to focus special attention on the natural-climatic and engineering-geological characteristics of the Tengiz deposit area. This is especially true of the project planning of footings and foundations. Soils in the construction area are distinguished by low support capacity and a high level of easily soluble salts. The groundwater, composed of brine, exerts a powerful corrosive action on concrete of all grades. Groundwater typically lies at a depth of 0.5 meters, depending on fluctuations in the level of the Caspian Sea.

Considering soil conditions, structures to be made of cast-in-situ concrete must be reduced to a minimum. The use of traditional footing designs made of cast blocks is also complicated because of the low support capacity of the soils, while the use of pile-supported footings is possible only if care is taken to have the piles impregnated in the plant with special styrene-epoxy resins.

VNIIST [All-Union Scientific-Research Institute for the Construction of Long-Distance Pipelines] is collaborating (on a contractual basis) on the design of prefabricated foundations made of standardized slabs on an earth filling, which have been tested successfully in the construction of pipelines, block-set units, and collapsible sets of buildings on Buzachi Peninsula.

The nature of the facilities to be built on the Tengiz deposit, especially units for oil treatment, gas desulfurization and refining, and sulfur production, will require the construction of foundations with a higher support capacity, including pile-supported ones. In selecting the project designs, therefore, it is essential at the same time to coordinate the type of structure with capabilities for manufacturing and erecting it. Maximum use must

be made of block-set building and structure designs, ready-made components making it unnecessary to build them up out of individual wall materials, cast-in-situ blocks, and asphalt concrete. Because of the high level of corrosive groundwater it is essential to bring the structures and utility lines up above that level.

The project-estimate documentation coming into the trust for negotiation does not yet fully meet these requirements. In the project for the infrastructural development of the first phase of the Tengiz deposit, for example, Giprovostokneft' Institute has incorporated large numbers of footings made of cast-in-situ concrete, production buildings made of prefabricated panels (without having tested footing designs suitable for the characteristics of the area), components made out of brick, road surfaces made of asphalt concrete, and supports and anchors made of ferroconcrete and metal that do not take account of the corrosiveness of the soils. The trust has submitted the appropriate criticisms, which must be taken into account when approving the project-estimate documentation.

In developing the Tengiz deposit, the use of these proposals, which are based on experience in construction in Mangyshlak Oblast, will make it possible to successfully carry out the tasks of infrastructural development of the new oil field.

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## OIL AND GAS

### 'ADVANTAGES' OF USING HYDROCYCLONES IN OIL EXTRACTION WORK

Baku VYSHKA in Russian 6 Jan 84 p 3

[Article by candidate in technical sciences, S. Tenengol'ts: "Why Have Hydro-Cyclones Been Forgotten?: Improving the Techniques and Technology of Cleaning Fluids"]

[Text] In accordance with the resolutions of the 26th CPSU Congress, highly efficient methods of recovering fuel from the earth's interior and advanced techniques and technology are being introduced on a wide scale in the oil and gas extracting industry. There are in the sector, however, still several problems, requiring fixed attention. Among them is an improvement in the systems for cleaning fluids of impurities.

If one takes borehole drilling, the first thing one has in mind here is cleaning the drilled-out rock from the drilling fluid and regenerating it. Due to the unsatisfactory, coarse cleaning of the fluid its quality is sharply reduced and the abrasion of pumps, drill-pipes and pipes is intensified. Indeed, emergency situations, complications and sticking often occur due to the unsatisfactory quality of the fluid.

As for oil extraction, the problem remains here of cleaning mechanical impurities from it, and when repairing wells--cleaning sand from the water when washing the sand bridges according to a closed cycle. In addition, it is also necessary to clean the waste waters discharged from the oil fields to the evaporation ground. There is a group of other problems related to protecting the environment, particularly under conditions of marine gas and oil extraction.

The problems indicated can be successfully solved with the aid of hydrocyclone equipment. Its action is based on the centrifugal effect of separating the solid particles from the liquid, when they are in rotary motion. A number of their advantages contribute to wide-spread distribution of hydrocyclones to clarify drinking water, purify sewage waters, draw admixtures from fluids, dessication of the coal and ores of nonferrous metals and freeing washing fluids of drilled-out rock. These are simplicity of structure, low cost, undemanding nature of its operation, high productivity and efficiency in eliminating solid particles. Finally, the decisive advantage: with respect to area and volume hydrocyclone units are 10-fold less than other cleaning equipment with the same power.

What then is holding back wide-scale distribution of hydrocyclone units in the oil industry? In my opinion, this negative attitude to it in the sector is caused by the imperfection of the first structures.

I happened to participate in the development and introduction of the first hydrocyclones for cleaning drilling washing fluids as early as the 50's. At that time the problems of designing hydrocyclones were complicated by the absence of a methodology for precise technical calculation. The researchers suggested approximated formulas for calculating the apparatus, operating under water with various suspended matter, and to reconstruct them as applied to the conditions of the oil extracting industry, an in-depth study had to be made of the processes of cleaning the drilling fluid in drilling, stratal waters, oil from mechanical admixtures, etc. The lack of theoretical work in this area held back the practical application of hydrocyclones.

Since then, as they say, a great deal of water has passed under the bridge. A series of studies of this sort was carried out in various years by colleagues of the Azerbaijan Institute of Petroleum and Chemistry imeni M. Aibekov and candidates of technical sciences B.M. Gurman and A.M. Mustafayev, with the participation of doctor of technical sciences Yu. A. Karayev and engineer V.P. Yershov.

The practical significance of these works lies in the fact that the authors examined as a group the work of hydrocyclones along with calculating the technological and geometrical parameters as applied to the oil and gas extraction industry, as a result of which it became possible to design hydrocyclones of various type-sizes.

They proved that the hydrocyclone method of cleaning drilling washing fluids was the most effective and economical. Its use makes it possible to eliminate solid particles 40-50 microns in size, while with other methods particles this small cannot be drawn from viscous drilling fluids.

However, even though the hydrocyclone method of cleaning drilling fluid was used for the first time in our country over a quarter of a century ago, and the first batch of hydrocyclone units, of AzINmash structure for regeneration of the weighting compound from drilling fluid was manufactured in 1959 by the Plant imeni Sardarov, to this day there are no plant-manufactured units at the oil fields. True, hydrocyclones are included in the group of closed circulation systems for drilling rigs, being issued by the Khodyzhinskiy Plant. The drillers, however, do not use them, explaining this by the low abrasion-resistance of the equipment.

The authors of the abovementioned studies suggested and tested improved structure of the hydrocyclones, using adeprene, produced in the association, Belorusrezinotekhnika. They developed for the needs of the oil industry test structures of press-molds, and with their participation, test forms of items made of adeprene were cast. It turned out, that their operational indicators do not change, even after 1200 hours of work.

Hydrocyclone units were successfully used by colleagues of AzINEFTEKhIM [Azerbaijan Institute of Petroleum and Chemistry imeni M. Azizbekov] to clean stratal waters of sand at oil gathering points in the Production Association imeni 26th CPSU Congress (Neftyanyye Kamni). In this case the degree of their being cleaned of sand was 95-98 percent. Also successfully tested were the experimental industrial hydrocyclone units for cleaning sand from the drilling fluid when washing the sand bridges during routine maintenance of the wells. This is particularly important, inasmuch as the amount of subsurface repairs involved in washing sand bridges at Neftyanyye Kamni constitutes a solid quantity--about 4000 a year. Tests which were also carried out at the NGDU Artemneftegaz fields, made possible a better study, not only of the process of separating the sand from the drilling fluid, but also of the possibilities of washing out the oil from it during passage through the apparatus.

At one time, taking consideration of the materials of the abovementioned studies, in the division of Marine Environmental Protection of Gipromorneftegaz, a unit was designed consisting of 10 hydrocyclones, which passed the tests and was recommended for introduction into industry. At the NGDU imeni Serebrovskiy, where these tests were made (division of field discharge waters from oil) encouraging results were obtained: hydrocyclones made it possible to implement more efficient cleaning than the oil-catching structures presently used at the oil fields.

In my opinion, hydrocyclones should find wide-scale use at the oil and gas extracting administrations of the Azneft' Association. After all, how many catchment lakes and stripping fields still exist in the oil fields of Aspheron! They occupy a huge territory, and the use of hydrocyclone units would make it possible to reduce it ten-fold.

The promising prospectives for use of these units dictate the need for an urgent solution to the problem of series output of hydrocyclones for the oil industry, with the manufacture of standard blocks and units for the purpose of utilization in various technical systems in operating and drilling wells, intrafield yield and preparation and transport of oil.

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## OIL AND GAS

### IMPORTANCE OF FUTURE PROSPECTING, EXPLORATION WORK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Jan 84 p 2

[Article by V. Venkov, M. Pel'o, M. Badikov and other drilling foremen of the Megionneftegazgeologiya Production Association: "Behind the Cloak of 'A Particular Opinion'"]

[Text] Every other ton of oil and every third cubic meter of natural gas are now extracted from the earth's depths at Tyumen Oblast. Without false modesty let us say that our work has no small share in this undoubted success of the oil field workers. After all, it is the collective of Glavtyumengeologiya that was entrusted with a crucial task--prospecting and exploration of hydrocarbon raw material, and the increase in reserves of it.

In order, however, for the geological prospecting to move constantly forward, it should be well and reliably equipped. A great deal has been done in this direction, but by no means everything. The "bottleneck" of preparing the oil and gas reserves is the poor degree of technical equipment of our drilling brigades.

One does not have to go far for an example. The construction of the most widespread turbodrill in geological prospecting, the 3TSSh-1-172, has not essentially changed in over 20 years. Due to this, in particular, indicators such as footage per bit and drilling rate will not increase for us. At one time this turbodrill served the prospectors of the earth's depths quite well, but now, having become out of date, it is an obstruction on the road to the further growth of labor productivity.

In the present five-year plan we are to fulfill a large volume of prospecting and exploration work. Realizing the importance of this task, the collective of scientists and designers of the VNIIBT Institute [All-Union Scientific Research Institute for Drilling Techniques] have created for geologists a new type of turbodrill, the TPS-172, with floating stators. The first samples of it, manufactured at the institute's experimental plant, we tested four years ago. The new equipment showed undoubted advantages over the series unit. The footage per bit increased by 30-50 percent, the between-repair operation period increased six-fold. For prospectors in the Siberian depths this is particularly important--after all, we work under conditions of the impassable roads of the taiga, far from the production bases.

It would appear that, having obtained such excellent results, the drillers should as soon as possible be equipped with highly productive and reliable equipment. But this, unfortunately, did not happen. The collective of the experimental plant at the institute is doing everything within its power: we obtain two or three sets of the new turbodrills a year. After all, though--it is a drop in the bucket. Our association alone needs dozens, and the main administration--hundreds of these turbodrills yearly.

Just why does the new equipment so slowly and with such difficulty force its way from the scientists' laboratory to the drill sites? We succeeded in finding out that, as far back as November 1982 the Western Siberian branch of VNIIneftemash, based in Tyumen, directed to the Ministry of Chemical and Petroleum Machine Building an Act of the Workers' Commission on the results of testing the TPS-172 turbodrill. The conclusion was unequivocal: to recommend it for series production.

On the basis of this document the ministry gave an assignment to the Turbobur Production Association, which is located in the city of Kungur, to produce, in the fourth quarter of last year, 20 sets of equipment, extremely necessary for the prospectors of the earth's depths. But up to the new year we have not received a single one.

What is the matter? It turns out, that the manufacture of the new product is "not in the hands" of the machine builders. In the act of the working commission the directors of the enterprise wrote down their "particular opinion": turbodrills, they say, are not bad, but are not technologically efficient. Plainly speaking, they are labor-intensive to manufacture.

Even if this is actually so, then, in our opinion, it is still necessary to produce it. After all, if formerly two-three turbodrills of obsolete structure were required for drilling each well, a single TPS-172 suffices to drill two exploratory wells. It is not hard to figure out what a savings this promises even with the "non-technology" of manufacture of the unit, if one takes into consideration the fact that in the present five-year plan Glavtyumengeologiya is faced with drilling 8 million meters of deep exploratory wells, and in the 12th Five-Year Plan--almost two-fold more.

12151  
CSO: 1822/206

## OIL AND GAS

### CASPIAN SHELF OIL PROSPECTING SHIP DESCRIBED

Baku VYSHKA in Russian 13 Dec 83 p 1

[Article by A. Gol'denberg: "Islands Astern: Self-sacrificing Work of the Marine Prospectors of the Depths"]

[Text] This silvery diesel-electric ship with a 22-meter tower on board could have been encountered this year at the Deposit imeni 28 April', which is 100 kilometers from Baku, and on the bank of the Adreyev in the region of the Baku Archipelago, at the aquatorium of the Shakhov Sea at the very tip of the Apsheron Peninsula and in other parts of the Caspian shelf, where a search is being made for oil and gas deposits. Based on the exploration ship "Ali Amirov", a geological party headed by the experienced engineer F.G. Pokhil', is preparing a work front for mobile drilling rigs, which, using the data it obtained, are driving shafts for deep wells into the depths. The results of the study of the geological-engineering features of the bottom structure, carried out on the ship, are used also by the construction workers of the stationary platforms and all those who take part in developing offshore oil fields.

For the first time in domestic drilling practice, the "Ali Amirov" is drilling wells without pipes. They have been replaced by a flexible drill string, freeing the drillers from exceedingly difficult operations for lowering and raising and screwing and uncrewing a heavy drill string. This considerably increases the mechanical rates of the drilling, and eliminates down-time due to pipe breakdowns.

The ship is held at the given position during drilling by means of an electronic computer. It takes the data from the instruments on the force and direction of the wind and waves, the rate of the current, the depth of the sea and, by processing them, gives the corresponding commands to the engines.

When one finds oneself on board the ship, it seems that the threshold of a large plant shop or a huge laboratory has been crossed--such a large number of mechanisms and instruments everywhere. Even from afar one can see the antennae of the radar and direction finders, television units, metal structures, twisting pipelines, winches and cranes, huge coils with a cable. On a black display board in the captain's cabin, red numbers light up one after the other.

"This instrument is only on our ship," the captain of the diesel-electric ship, A. Korobkov, tells me. "The accurate sonar fixes even the ship's deviations from the vertical that are not noticed by a person most sensitive to the ship's motion. For an ordinary ship these fluctuations are not important, but our ship is a floating borehole, and this equipment makes it possible to drill wells even in stormy weather."

This year the brigade of the young drilling foreman Is Nasibov drilled from the "Ali Amirov" over 6000 meters of boreholes, having met the coming new year ahead of schedule. The socialist commitment was also exceeded. Also distinguishing themselves were driller Abbas Imanov, assistant drillers Farid Kerimov and Petr Mikhaylov, electrician Yuriy Markarov and others. They are working not only quickly, but also economically and efficiently expending instruments and materials and due to this the harmonious collective has saved 800,000 rubles since the beginning of the year.

The specialized ship is also equipped with apparatus that makes it possible to carry out geophysical research. The prospectors of the marine depths since the beginning of their year have carried out work on sections of the shelf with an extent of about 700 linear kilometers.

Day and night the "Ali Amirov" plies the sea, leaving astern not only a foamy wake, but also steel islands with peaks of towers, which afterwards rise up where the exploratory ship, the laboratory ship has passed.

12151

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## OIL AND GAS

### BRIEFS

EARTH'S HEAT AS FUEL--Lvov--In the logbook kept at the borehole near the Transcarpathian village of Nizhniye Remety, the following entry appeared: "The depth mark of 2400 meters was passed." The Dolina drilling foremen from the Ukrneft' Production Association are engaged this time in not quite their own occupation. The well sunk in Beregovskiy Rayon is not seeking oil--it will be the first main line to underground energy treasures. "In our republic," says V.V. Baybakov, head of the department at the Institute of Geology and Geochemistry of Combustible Minerals of the UkSSR Academy of Sciences, "there are several places that are promising with respect to thermal resources. The largest are in the zone of the Transcarpathian trough, which is because of the relatively recent volcanism. Geologists discovered hot water here." The borehole near Nizhniye Remety will make it possible to determine the reserves of underground heat and in the future may become one of the elements of the circulating system for the geothermal electric power station. Ukrainian scientists have worked out an original method of drawing heat from the rocks--by means of blasting. It forms a unique reservoir under the earth, in which cold water fed from the earth's surface will be heated. It rises upward in the form of superheated steam. The latter will be the power for the turbine at the geothermal electric power station, will heat residences, hothouse combines, etc. With respect to reimbursement and work stability, the geoTES is an efficient type of electric power station for the future. [By A. Rudenko] [Text] [Kiev RABOCHAYA GAZETA in Russian 16 Oct 83 p 1] 12151

NEW TYUMEN OIL DEPOSIT NAMED--Tyumen, 3 Jan--Bakhilovskoye--this is what geologists have named the new oil deposit which has become a unique companion to the famous Samotlor. This underground store house was named in honor of Party worker V. Bakhilov, who was at the source of the great Siberian oil. To name new deposits after people who have devoted their lives to developing an oil and gas region has become a nice tradition in Tyumen Oblast. Muravlenkovskoye, Poakhovskoye, Bovanenkovskoye and other underground storehouses have thus appeared on the geological map. [By V. Lisin] [Text] [Moscow PRAVDA in Russian 4 Jan 84 p 3] 12151

CONSTRUCTION PROJECT PROGRESS--Zhdanov (Donetsk Oblast)--Testing has begun on the equipment of the first section of the plate steel rolling mill 3000 at the Zhdanov Metallurgical Plant imeni Il'ich. It is calculated for a yearly production of 1.2 million tons of cold-resistant sheet steel, designed mainly for the pipe industry. [Text] [Moscow TRUD in Russian 24 Dec 83 p 1].

Mazheykyay (Lithuanian SSR)--An important stage in development of Lithuanian petrochemistry is marked by construction of the second section of the Mazheykyay Petroleum Refinery. The complex for primary raw material refining put into operation here yielded its first output yesterday. Having achieved the planned capacity, the enterprise will considerably improve the supply of the Northwest of the country with mazut, gasoline and compressed gas. The huge Mazheykyay plant is being constructed with the aid of the country's fraternal republics. [Text] [Moscow TRUD in Russian 24 Dec 83 p 1].

Leningrad--Operations to assemble the 350-ton unit of the superstructure for the nuclear-powered vessel "Rossiya" was completed ahead of schedule by the shipbuilders of the Baltic Ship Building Yards imeni Sergo Ordzhonikidze. [Excerpt] [Moscow TRUD in Russian 24 Dec 83 p 1] 12151

KAZAKH GASIFICATION CHAIRMAN APPOINTMENT--Alma-Ata (House of Government), 4 Jan--Ukase of the Presidium of the Kazakh SSR Supreme Soviet on the appointment of Comrade V.A. Putintsev as Chairman of the Kazakh SSR State Committee on Gasification. The Presidium of the Kazakh SSR Supreme Soviet decrees: To appoint Comrade Vladimir Aleksandrovich Putintsev chairman of the Kazakh SSR State Committee on Gasification. Chairman of the Presidium of the Supreme Soviet of the Kazakh SSR, S. Imashev and Secretary of the Presidium of the Kazakh SSR Supreme Soviet, Kh. Demesinov. [Text] [Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 5 Jan 84 p 1] 12151

UZBEKISTAN INDUSTRY NATURAL GAS--(UzTAG)--The control jet, lit on 2 December at the gas distribution station of the Akhangaran Cement Combine, marked an important step in the development of Uzbekistan industry--natural gas from the underground stores of the Karshin Steppes arrived at the republic's main industrial zone. The first, 126-kilometer section of new gas main pipeline from the Syrdar'ya GRES--Tashkent was put into operation. The construction workers have started testing the next one--from Akhangaran to Tashkent. They intend to turn over fully for operation the 204-kilometer gas pipeline, over one meter in diameter, by the end of the year. [Text] [Tashkent PRAVDA VOSTOKA in Russian 3 Dec 83 p 1] 12151

AZERBAIJAN GAS PRICE CUTS--(AzerINFORM)--Gas prices for individual appliances designed for heating facilities have been cut in the republic's territory. It is established in the following amounts: for a brick stove--3 rubles, instead of 5 rubles 60 kopecks. For a wall oven--2 rubles, 50 kopecks, instead of 4 rubles. For heating appliances (temporary connections)--4 rubles, 08 kopecks, instead of 7 rubles, 60 kopecks. For a radiator furnace--1 ruble, instead of 1 ruble, 20 kopecks. In addition, the price for a waterheating geyser (homemade) as well as for certain other appliances, has been reduced from 4 rubles to 2 rubles, 14 kopecks. Some 12 million rubles were allotted from the State Budget for these purposes. However, the republic's rapidly developing gasification requires a further increase in the State's outlay to

compensate for the costs of gas consumption by the population. Therefore, everyone who uses natural gas should use this precious fuel as economically as possible and promptly replace uneconomical appliances with improved ones. [Text] [Baku BAKINSKIY RABOCHIY in Russian 8 Dec 83 p 1] 12151

BOREHOLE PROCEDURES IN TURKMENIYA--(TURKMENINFORM)--The boreholes which the workers of the Kugitanskaya Geological Prospecting Expedition are drilling have become more generous. The introduction of new technology for treating the shafts helped to increase the inflow of water from the underground levels. Clay drilling mud is usually used when drilling rock, to cool the drill bit, bring the small crushed particles to the surface and especially to secure the walls of the boreholes. In the drilling shafts, however, it often turns from an ally into an adversary--the clay mud cake clogs the pores and cracks in the beds and reduces the inflow of water from them. Expedition innovators Ya. Khudoyarov and D. Saparov suggested for treating boreholes drilled with clay drilling fluid, to use a piston with valves. It is enough to let it down into the drill hole, and in it, due to the action of the water, the valve is opened and the water rushes upward. With the rise of the piston the valve is closed and the vacuum forms at the bottom. The pressure differential between the bed head and the liquid column in the hole completely destroys the clayey cake. The innovation promises many advantages, particularly as, previously the drill shaft had been freed of clay by long pumping out of the water by means of compressors, which consumed a great deal of time and fuel. [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 7 Dec 83 p 2] 12151

SIBERIAN WELLS REACTIVATED--The first working day of the new year for the underground repair of wells brigade of P. Tsyplukhin became a lesson in work skill. A well formerly written off at the Mamontovskoye Deposit again yielded oil. In all, the collective of the Mamontovneft' Administration, in 24 hours, obtained over 100,000 tons of fuel--600 tons more than planned. The Siberian people see in the prolongation of the well's active life one of the basic reserves for increasing oil extraction in the new year. That is why, as early as December, each underground shaft was inspected. Fifty wells, which can no longer flow naturally, were converted to a mechanized extraction method. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Jan 84 p 1] 12151

FOREST TUNDRA OIL GUSHER--Salekhard, 8 Jan--The beginning of winter at Yamal happened to be stormy, with a great deal of snow. But the Yamal geologists were not intimidated by the elements. At the Purneftegazgeologiya Production Association they withstood the inclement weather doggedly, with a wealth of experience. And indeed, they struck oil in the forest tundra. The collective of V. Drayko's brigade opened up the new Ust'-Kharampurskoye deposit. [By H. Mikhali'chuk] [Text] [Moscow PRAVDA in Russian 9 Jan 84 p 1] 12151

GAS PRODUCTS IN UKRAINE--Ivano-Frankovsk--Stable gasoline, standard butane, industrial butane, a propane-butane mixture and other important national economic products are being issued by the Dolina Gas and Gasoline Plant. The enterprise, with a high production standard is working without a break, and since the beginning of the year delivered to the consumers above-plan raw material amounting to about 600,000 rubles. All the additional output was

issued by virtue of raising labor productivity which has increased here by 8 percent. The smooth work of the equipment and high technological and production discipline--those are the components that permit the collective to achieve high labor results. Showing an example of the Communist attitude toward work are operators T.L. Antonovich, V.N. Kopko, machinists N.A. Dishkant, D.M. Dobrovnyy and K.I. Strutinskiy, fitters N.P. Yurinets, I.P. Kleveta and others. [Text] [Kiev RABOCHAYA GAZETA in Russian 19 Oct 83 p 1] 12151

DEEP DRILLING IN POLTAVA--Poltava--The deep-drilling brigade headed by Ivan Sukhar was one of the first in the Poltavaneftgazgeologiya Association to complete the assignment for three years of the five-year plan ahead of schedule. The major achievement of this collective was accelerated drilling of an ultra-deep well--6,506 meters. A wealth of experience helped the explorers of the earth's depths. They skilfully used, depending on the depth, various turbo-drills and bits, drilled three paths by means of a diamond instrument and employed supersonic defectoscopy to test the state of the drilling pipes. All 75 Poltava brigades of depth explorers engaged in studying the potential of deep-lying oil and gas beds are competing for the successful fulfillment of the assignments of the five-year plan. [By A. Vyatkin] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 3 Dec 83 p 1] 12151

NEW CASPIAN OIL DEPOSIT--The potential of the oil and gas bearing deposit Duvanny--Sea-2 in the Caspian confirmed the new deposit discovered by geologists. Oil from the deep well drilled here of over 5500 meters went along the pipeline to the mainland. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 12, Mar 84 p 3] 12151

CASPIAN OFFSHORE DRILLING PROGRESS--The assembly workers from the SMU-4 Trust, Kasporneftegazstroy, are completing the assembly of the second support for one more steel island, which will rise above the waves of the Caspian, at the Deposit imeni 28 April'. Twenty-four wells will be drilled here, twice as many as from the preceding islands. The supporting unit, weighing almost 3000 tons, will be ready for transport this March. [Text] [Baku VYSHKA in Russian 16 Feb 84 p 1] Baku--Reconstruction of the Bakhar offshore oil field, located 25 kilometers from Baku, has been completed. All the field's wells are hooked up to an automated control system for the oil extraction process. Automation has improved the work conditions for the operators, made it possible to cut their number and increase oil recovery from the depths due to a more efficient system of equipment operation. By the end of the five-year plan all the offshore fields of Azerbaijan will be changed to automated control. [Text] [Moscow TRUD in Russian 27 Dec 83 p 1] 12151

TYUMEN WELLS OPERATING SUCCESSFULLY--Tyumen--Expeditions from three of the six Tyumen geophysical trusts--Nefteyugayskiy, Megionskiy and Surgutkiy--are completing studies of the wells in accordance with the plan for next January. "We reduced our work time when sinking shafts by 15,000 hours this year," said I.M. Dvopolyuk, chief of the Zapsibneftegeofizik Administration, "and thus gave the drill workers the possibility of constructing an additional 62 wells. Beside that, over half a hundred of the reduced wells received a



second life. The seismic explorers turned over for drilling above-plan structures, ensuring an increase in the reserves of valuable raw material." The success of the Tyumen geophysicists became possible due to the transition to brigade contracting, as well as to the skilful use of highly productive equipment. [By Yu. Kalinnikov] [Text] [Moscow IZVESTIYA in Russian 19 Dec 83 p 1] 12151

VERSATILE NEW LEBEDYAN PUMPS--Lebedyan' (Lipetsk Oblast)--The collective of the Lebedyan Machine Building Plant has begun series output of oil pumps with a new, standardized modification--the U-9. They are distinguished by increased reliability in operation, a broad range of use, and with respect to their technical performance are not inferior to the best world models. Standardization of similar assemblies and parts will make it possible for the machine builders to regenerate in a year almost nine-tenths of the oil and gas extracting equipment produced. This year already the enterprise will ship to the country's oil fields 2800 new pumps. [By N. Klimov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Feb 84 p 2] 12151

CHIMKENT PUMPING STATION CONSTRUCTION--Chimkent (KazTAG)--The construction administration No 2 of the Sredazneftegazstroy Trust began construction of a pumping station for the Pavlodar-Chimkent oil pipeline in the center of the Betpakdal desert. Housing construction has begun, the foundation has been laid of a building for automated control of the equipment operation and artesian wells are being drilled. When the station is put into operation next year the throughput capacity of the oil pipeline will increase by more than one-fourth. [Text] [Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 14 Dec 83 p 1] 12151

TATAR OIL WORKERS' SUCCESS--Al'met'yevsk (Tatar ASSR)--Oil field workers of the Tatneft' Order of Lenin Association have won a great labor victory at the finish of the year--they extracted from the earth's depths one million tons of fuel above the plan for three years of the five-year plan. This important addition is the result of the selfless labor of the Tatar oil workers, who succeeded by advanced rates in putting into operation new capacities for fuel extraction and processing and in introducing advanced methods for increasing the oil yield of the beds. By virtue of wide-scale introduction of brigade forms of organization and wages, the extraction workers succeeded in raising labor productivity and efficiency considerably. Today, at the sector's leading enterprise, two-thirds of the collective are already working according to brigade forms of organization and wages. The greatest contribution to the above-plan million was made by the oil field workers of the Order of Lenin Al'met'yevskneft Administration: their addition--almost 180,000 tons. [By A. Mannanov] [Text] Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 Dec 83 p 1] 12151

KRASNOVODSK REFINERY DISTILLATION UNIT--Krasnovodsk (Turkmen SSR)--A unit launched yesterday at the Krasnovodsk Petroleum Refinery will make possible more efficient use of oil. It is designed for vacuum distillation of mazut. Raw material for manufacturing gasoline, coke and bitumen will now be obtained from this product. By putting this unit into operation, the enterprise has solved the problem of providing raw material for coke production. [Text] [Moscow TRUD in Russian 13 Jan 84 p 1] 12151

CSO: 1822/206

## COAL

### PROBLEMS WITH EKIBASTUZ COAL SUPPLY NOTED

[Editorial Report] Alma-Ata SOTSIALISTIK QAZAQSTAN in Kazakh 19 October 1983 carries on page 2 a 1,100-word article by O. Qaliyev on the many problems of coal supply within the Pavlodar-Ekibastuz Complex. The article is published under the regular rubric "Today at the Pavlodar-Ekibastuz Territorial Production Complex."

Qaliyev begins by noting the great value of careful coordination of the various activities of a great complex such as Pavlodar-Ekibastuz where the final product, energy, now 8 percent of total Soviet generated power, only comes into being as a result of the close cooperation of miners, railway transporters and the energy workers themselves. Underscoring that much is in fact being done to this end--he notes, for example, increased coal production, movement and use to produce energy, this year compared to last--he also complains about much inefficiency in the work of all three sides of the Ekibastuz-Pavlodar triangle, inefficiency that has created an "imbalance," in his words, between coal producers, available transportation and coal use, resulting in lowered coal production, transportation shortfalls and reduced use of the energy plants and thus energy output.

Specific complaints include: failure by energy producers to turn cars around fast enough, damage to cars from careless use--60,000 are said to have needed major repairs last year, with 12,000 so severely damaged so as to have to be returned to the factory for rebuilding, lack of systematic delivery of cars to the mines, resulting in idle mine excavators, failure to use technology properly, generally poor railway stations, a lack of coal reservoirs--meaning that coal is used directly from freight cars and must be kept on them prior to use, a highly inefficient use of the freight cars--and substandard coal--300 carloads to Ermak last year. The latter problem is particularly troublesome since it represents not only inefficient use of transport but also results in increased coal consumption to achieve the same energy output.

Qaliyev ends by calling for establishment of a special commission to solve the problems discussed in his article. To Qaliyev, the Pavlodar-Ekibastuz complex is too important to allow such deficiencies to effect output adversely, especially because, in his view, only a few changes and improved coordination can rapidly change things for the better.

## NON-NUCLEAR POWER

### PROSPECTS FOR DEVELOPMENT OF TIDAL ELECTRIC POWER STATIONS

Moscow PRAVDA in Russian 17 Dec 83 p 3

[Article: "Taming the Tides"; under the rubric "PRAVDA Has Commented What Has Been Done?"]

[Text] The USSR Ministry of Power Engineering and Electrification examined an article with this title (PRAVDA, 4 January), informed Deputy Minister F. Sapozhnikov. The ministry outlined specific measures to assure development of tidal electric power stations (PES). In 1983 the Gidroproyekt Institute imeni S. Ya. Zhuk will complete the substantiating material for construction of an experimental industrial PES in Kolskiy, and in 1985 will execute preliminary work on the Mezen and Penzhina PES.

For the purpose of continued more thorough utilization of the Kislogubsk ya experimental station, a scientific methodological group on tidal electric power stations and floating structures is being formed to serve as Gidroproyekt's research base within the body of the scientific-research branch of this institute. The group will perform and coordinate study of PES hydroaggregates, construction techniques using flotation methods, study of thin-walled structures and the formation of ice dams, and materials for offshore structures and the means to protect them from biological and chemical corrosion. The Kislogubskaya PES will allocate for this purpose transport vehicles and other equipment, homes for operational and research personnel, and will carry out repairs of the hydroaggregate unit.

It is noted in the response that modified tidal aggregates may be built only by joint efforts with the Minenergomash and the Minelektrotekhprom. The ministry is also counting on further active participation in the ongoing work of the Murmansk, Northern and Kolya administrations of the State Oceanographic Institute, the Leningrad Hydrological Institute of the USSR Goskomgidromet and the Pacific Ocean Oceanographic Institute of the Far Eastern Scientific Center of the USSR Academy of Sciences.

The [PRAVDA 4 Jan] article was also examined by the Ministry of Power Equipment Construction. The Turbine Building Leningrad Metals Plant Production Association and the NPO TsKTI [Scientific Production Association of the Central Scientific Research, Planning and Design Boiler and Turbine Institute im. I.I. Polzunov] are developing technical proposals for creation of a horizontal

reversible hydroaggregate with maximal diameter and one-way and two-way operating capacity for tidal electric power plants. A schedule of estimated development work to 1985 was compiled on the basis of selected variants. The preliminary parameters of the 10 m capsule hydroturbine were turned over to the Gidroyekht Institute.

It was resolved to develop a capsular pump-turbine with a six-stroke work regime as the basic variant for the experimental industrial tidal power plant. A precise schedule of estimated research and development, that takes in account the developmental work on the technical proposal in 1984, was compiled.

In addition, the response notes that the actual demand for large-scale tidal power plant construction in the near future requires a thorough economic basis. The USSR Minenergo must assume responsibility for this work.

Director of the Pacific Ocean Oceanographic Institute Academician V. Il'ichev revealed that hydrological and geologico-geophysical research on the proposed lines of tidal electric power stations in Penzhina Bay is planned for 1983-84.

The prospects for construction of tidal electric power stations also depend largely on the efforts of Minelektrotekhprom's institutes and enterprises. The editorial staff awaits the response of this branch's managers to the article "Taming the Tides."

12421

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## NON-NUCLEAR POWER

### EFFECTIVE MANAGEMENT MAXIMIZES PRODUCTION AT ZAPOROZHYE GRES

Moscow PRAVDA in Russian 11 Dec 83 p 2

[Article by V. Cherkasov, PRAVDA correspondent: "Energodar's Share"]

[Text] The collective of the Zaporozhye GRES now produces the least expensive electric power of all the nation's thermal power plants. The fuel-unit consumption here reached 319 grams per kw/h as against 322 grams, the amount allotted for the project. In this way more than 15 echelons of mazut and coal have been conserved since the beginning of the year.

Imagine that millions of televisions were connected to a network simultaneously. This happens during the most popular broadcasts--holiday concerts, football matches, etc. In order for the picture on our screens to be normal, capacities equal to two Dneproges plants must be connected to the nation's central power system. The peak hour is anticipated in advance and instructions to send the full load at such-and-such hour are sent beforehand to the GES, GRES or AES. There may arise an emergency situation when an entire station may disappear from the electric supply system. Then its share is distributed among its neighbors.

The readiness of a station to bear the power load is the main indicator characterizing its work. At the Zaporozhye GRES it has now reached almost 104 percent, a high figure. It means that, when necessary, the huge plant rapidly switches all its might to the Unified Power System in the European part of the USSR. This capability of the GRES is used most often at the peak hour.

The economical features of the Zaporozhye GRES is found in its design. One of the largest in the world, with a capacity of more than 3.6 million kw, this station was erected on the sandy slopes beside the Kakhovskoye Sea. Not even sagebrush grows here, so that not a hectare of Ukrainian chernozem was used either for the GRES itself or for the remarkable neighboring village for power workers. To this we add the proximity of water and fuel resources. The station, especially its first stage, actively utilizes the unproductive sections of the Western Donbass.

Due to successful effort, the station came on stream ahead of schedule and without defects. The builders, the majority of whom arrived here from Dneproges-2, handed over the new power giant without a hitch. Already after

2 weeks, after the start-up of the last seventh unit, its design capacity was reached.

How do they economize here? The station's chief engineer, I. Strelchenko, working at the GRES since its start-up, points at the plan of undertakings adopted at the meetings of the subdivision's collectives. It would seem there is nothing here to economize: the design determined both the capacity of the aggregates and fuel consumption. However, the thrifty will find large reserves of economy without sacrificing the normal operation of the GRES.

The machinists of the GRES use this phrase: structure of power output. It is among the best at Zaporozhye. Senior Foreman Anatoliy Prodashchuk bears the title "best in the profession of the Ukrainian SSR Minergo." He operates the control console. Explaining the fine points of his job, he emphasizes that it is important here that improvement of the operating conditions not be associated with additional labor costs; it depends entirely on the worker's experience and attentiveness.

"The main thing is to control the operating conditions sensibly," he remarks. "With the slightest deviation, the fuel is overconsumed and the equipment wears out faster."

Automatic instruments reliably control all of the station's engineering processes. The machinist immediately knows where the heat leakage is. Then they suggest how to improve things. Over the 10 years of the GRES' operation, workers and specialists have implemented thousands of these proposals. It is worth discussing one of these in greater detail.

Everyone knows that when steam passes through pipes, salt remains and forms a deposit on the walls. Because of this, the aggregate's heat conductivity, of course, decreases. How can one avoid this evil? They use a simple method at Energodar. A special installation pushes ordinary rubber balls through the pipes and they clean the walls. The balls circulate in the pipeline system approximately a month until they are worn down, then they are replaced by new ones.

Only there is a catch: where to get these balls? GRES Director V. Polivanyy, discussing this, complains: "Plants producing rubber articles do not take our order--it is too small. It would have been possible to organize production of balls at a special enterprise in the very USSR Minergo system, so that all of the stations might be furnished with them. But so far we are producing them by a primitive method."

On the threshold of winter and autumn, on a November day, the management of the Dneproenergo Association ceremoniously presented to the Zaporozhye GRES collective the "Passport of Readiness for Winter Work." The important document was preceded by much preliminary work on the part of the collective. It emphasizes that, during any capricious weather and any unexpected events, Energodar is number one in readiness.

BRIEFS

PRIMORSKAYA GRES GETS UNIT--Maritime Kray--The eighth power unit came on line at Primorskaya GRES, the largest in the Far East. This New Year's gift is especially valuable to Far Easterners, for the rapidly developing economy of the neighboring rayons has been experiencing an acute shortage of electric power, especially during the freezing winters. The power plant is being built near a coal deposit in northern Maritime Kray. Luchegorsk, a town of coal miners and power workers, is growing along with it in the sparsely populated taiga rayon. Thanks to implementation at the building site of superior work methods and the collective's seasoned know-how and mastery, the eighth power unit was set up much more rapidly than previous ones. [By V. Sungorkin] [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 13 Jan 84 p 1] 12421

STAVROPOL'SKAYA GRES IS COMPLETED--Solnechnodolsk (Stavropol' Kray) 28 [Dec]--The eighth power unit, which completes the plan, began operating at the Stavropol'skaya GRES. Senior Duty Electrician V. Urbanovich connected it to the network. The event occurred when the shift headed by A. Kharlamovyy was in charge. Like its seven predecessors, the new aggregate has a capacity of 300,000 kw. The power plant's total capacity is now 2.4 million kw. A professional engineering academy, a number of social and cultural facilities and scores of new apartments will be built in Solnechnodolsk, located on the banks of a scenic water reservoir. In a word, the shaping of the power center is continuing. [By V. Pankratov, PRAVDA correspondent] [Text] [Moscow PRAVDA in Russian 29 Dec 83 p 3] 12421

TASHKENT PIPELINE BEGINS OPERATION--Akhangaran (Tashkent Oblast)--Natural gas from the underground deposits of the Karshi steppe arrived at the town of Akhangaran in Tashkent Oblast. The first section of the Syrdar'ya GRES to Tashkent pipeline began operating. Accurate engineering and skillful organization of competition helped speed up construction of the line. It was laid from two ends--from Shirin, a town of power workers in Golodnaya steppe, where Karshi gas was delivered only 2 years ago, and from Tashkent. The first section of the gas pipeline is operating, and the builders began testing the second line from Akhangaran to Tashkent. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 3 Dec 83 p 1] 12421

UNIT THREE FOR AZERBAIJAN GRES--The third power unit of Azerbaijan GRES sent its first industrial current. It has a capacity of 300,000 kw. One of the largest new structures of the present 5-year plan, the station now produces



almost a fifth of the republic's total electric power. This is a substantial addition for the united Caucasian system, whose electric network receives electric power produced in Mingechaur. [Text] [Moscow TRUD in Russian 17 Dec 83 p 1] 12421

KARMANOVO GRES RUNS ON GAS--Neftekamsk--The first 100 million kw/h of electric power was produced by two units of Bashkiriya's largest Karmanovo GRES, which switched to gas arriving here from Urengoy. The remaining four aggregates will also switch to inexpensive natural gas. It has been hypothetically calculated its use will make it possible to conserve scarce liquid fuel in the amount of about 3 million tons a year. Electric power production will increase approximately 300 million kw/h. Moreover, use of labor for repairs will decrease and air pollution will practically stop. [By I. Payvin, SOTSIALISTICHESKAYA INDUSTRIYA correspondent] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Jan 84 p 1] 12421

NEW COAL TRANSPORT GALLERY--Krasnoyarsk Kray--A unique structure, a 15-km transport gallery for delivering coal from the Berezovo cut to GRES-1, is being built at KATEK [Kuybyshev Automobile and Tractor Electrical Equipment and Carburetor Plant]. Two conveyors will be installed on the gallery, which will run at a height of 4 to 40 meters above the ground. Each of the conveyors has a productivity of 5,250 tons a year. Large-unit installation is planned in order to speed up its construction and increase its efficiency. Workers of the Krasnoyarsk Steel Construction Trust will install 736 60-ton units here. Such industrialization will make it possible to increase labor productivity by 15-20 percent. [By I. Nikolaychuk] [Text] [Moscow STROITEL'NAYA GAZETA in Russian 10 Feb 84 p 3] 12421

NERYUNGRI GRES START-UP--Yakut SSR (TASS)--The first 210,000-kw capacity power unit built at Neryungri GRES began operating yesterday. The aggregate's power is sent to the most important facilities of the Southern Yakut Territorial Production Complex, settlements near arteries and railway stations on the Tynda-Berkakit line. Power builders achieved a large volume of work in a short time. In unoccupied areas they built a powerful production base, the comfortable Serebryanny Bor settlement--with well-built homes and social and cultural facilities. Power transmission lines were laid across mountains, valleys and marshes and substations were built. Dozens of complex structures were built near the GRES, such as a main building and dam, and technical and power equipment were installed. All of this was accomplished in conditions of permafrost, severe Yakutian cold and the high seismicity of the Stanovoy Ridge. Accomplishment of this volume of construction and assembly work in such a short time was made possible by the implementation of many engineering and technical innovations and application of experience gained at similar construction sites. Competition of equipment builders and dispatchers according to the "Worker's Relay Race" had a considerable effect. Materials and technology arrived strictly according to schedule from all corners of the nation. The Neryungri GRES is being built by experienced workers. Among them are many who built the Bratsk, Viluy, Kolyma and Ust-Ilimsk hydraulic power stations. Representatives of almost 50 nationalities work shoulder to shoulder on the work site. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 23 Dec 83 p 1] 12421

## COMPRESSOR STATIONS

### CONSTRUCTION COMPLETED AT ALGASOVSK STATION

Moscow MOSKOVSKAYA PRAVDA in Russian 5 Jan 84 p 2

[Article by USSR Ministry of Special Installations press center correspondent N. Pozhidaeva: "Secrets of Acceleration"]

[Excerpts] A brigade of Moscow installers has completed construction of the Algasovsk compressor station, 120 kilometers from Tambov on the 2760-kilometer Urengoy--Uzhgorod route.

#### First Test

What projects haven't the experts at the Moscow directorate for refrigeration and special plant installations for the Soyuz Industrial Installation Trust of the USSR Ministry of Special Installations had to build? Refrigeration works, modern vegetable storage units, and vast fields of artificial ice. But they haven't had to work on gas pipelines before. Preparation for the fulfillment of the primary task began long before their first appearance on the route.

"First of all we organized courses for the training of engineering and technical workers in the peculiarities of construction of gas industry installations," says the head engineer of the directorate, N. F. Kuznetsov.

"Every engineer passed a test of his tolerance for the work. Then the special training of welders began. A special feature of the erection of gas compressor stations is the huge volume of welding work. And this is not ordinary welding. The pipes are made from very hard steel, they are welded with special electrodes, every weld is checked with x-rays, and the quality must be flawless."

Theoretical and practical exercises went on for two weeks. At the end of them, every one of the 45 welders made a control weld. Then began days of feverish activity. The construction site was still not ready, but the installers were supposed to foresee everything. In the directorate's workshops freight lifting mechanisms were being prepared, tools supplied, and portable facilities for the workers' needs sent to the site. This was a start. But to reach the finish, much still faced the installers.

### A Fact from the Project's Profile

Every project begins with a road. The road feeds it machines and mechanisms, equipment, and people. At the Algasovsk Station, the general contractor didn't lay the road from the Tambov--Shatsk route on time. And here in the Tambov Oblast, in Russia's chernozem zone, if you take one step to the side of the road in spring or fall you get stuck up to your knees in mud. Heavy equipment, turbines and motors could not be taken to the site on time. The builders and installers both had a hard time, but especially the installers. It was up to them to finish the construction, to break the finish tape. And the assignment of the work was still delayed.

We are talking with one of the installers, I. A. Nesterov. "The trenches for the pipe still weren't ready, and neither were the foundations for the equipment when we began the preliminary assembly on the site. Thirty-five meter lengths of pipe were assembled ahead of time, and all the pipe joints were virtually consolidated beforehand. For their inclusion in the station's technological circuit later it was necessary only to weld two seams.

The installers managed to catch up. The thorough engineering preparation of the work, and the employment of industrial installation methods also played their roles. No less important is the expertise of the workers, the personal responsibility of each, and the continuous creative search.

12461  
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## GENERAL

### OFFSHORE SETTLEMENT PLANNING REVIEWED

Baku AZERBAYDZHANSKOYE NEFTYANOYE KHOZYAYSTVO in Russian No 12, Dec 83  
pp 41-45

[Article by O. A. Shchetnev and M. R. Ovchiyan, "Analysis of the Experience of Forming the Social Infrastructure of the Neftyanyye Kamni Settlement"]

[Text] At present, the question of creating offshore settlements is considered as a component of the problem of organizing the industrial development of offshore oil and gas fields. Therefore, these settlements must be a result of the development of the corresponding oil and gas producing enterprises. Since the management-economic direction of such enterprises is homogeneous, it is easy to delineate the basic town-forming factors. The first and most basic of these factors is the natural resource base on which the industrial direction of the offshore community is formed. The second factor is a geographical one, limited by the water depth where development is taking place and by the distance from the base city, which is important only at the early stages of development. This steadily loses importance as the sector's scientific and technical development progresses. The transport network--the basis of the spatial development of the settlement--is the third factor. Under offshore settlement conditions, the platform is the main utility element. It is the framework on which the basic structure of the city is formed. The fourth factor is power. The sources and type of energy that are used determine the "vital services" of the offshore settlement. The experience of building the Neftyanyye Kamni settlement showed that the large construction base used to develop the oil field can later be successfully used and continues to be used for the construction of housing, service and industrial facilities. Construction methods used for hydrotechnical structures were used to build housing and service buildings, significantly enriching the practice of offshore design and construction. Besides, without a large construction base, it would have been impossible to create the present offshore settlement, a "city-type settlement." This allows the construction industry to be considered as one of the town-forming factors. And finally, the sixth factor is the workforce. Under the conditions of intensive offshore oil and gas development and its accompanying large construction projects, a local workforce has materialized which forms the backbone of the offshore settlement's population. Because of the special aspects of production organization, the workforce is the main town-forming group in the Neftyanyye Kamni settlement. In the final analysis, the planning tasks and goals must meet their needs. In addition, they are the most active town-forming factor. Their effect on infrastructure formation must be forecast at all stages of planning.

The experience of planning and building the Neftyanyye Kamni settlement showed that it is impossible to site the industrial enterprise beforehand or to localize the work area into a single industrial zone. The profitability of industrially developing one or another zone is determined in the secondary development stage. In the Neftyanyye Kamni settlement, the working areas are spread out in various directions and at various distances. Their spatial development has been continuous and explosive. The settlement can be viewed as an open system, continually developing in time and space, of industrial units connected to a relatively static residential zone. It is important to note that the quantity and intensity of these interrelationships are practically impossible to determine from a distance with any accuracy. This is the first reason that it is impossible to implement the principle of functional territorial zoning.

It must be considered that the elements of the industrial system are not structurally homogeneous and therefore have different service lives and are to varying degrees subject to change. This feature is reflected in the factor of the pulsating size of the workforce. If, in the early years of oil field exploitation a large part of the volume of work is drilling, then subsequently work on development construction, the recovery and transport of oil and gas is added to this. It is apparent that at a certain stage the situation arises where the workforce consists of two, and sometimes more, groups. This is a peak in the population growth of the offshore community. After that, the workforce tends to either stabilize or decrease. Being one of the town-forming factors, the workforce at different time intervals reflects the process of growth and stabilization of the social infrastructure. Therefore, if up to the end of the 1960's the workforce at Neftyanyye Kamni increased constantly, then since the mid-1970's it has remained almost unchanged. In the future, as automated control systems are implemented, the majority of the labor-intensive jobs are automated, the volume of capital construction decreases and new technologies are introduced, the number of workers will decrease. Bringing deeper oil and gas reservoirs into production will again lead to an increase in the workforce. This is also a substantial argument in favor of a qualitatively new approach to the formation of offshore settlement infrastructure, giving it sufficient flexibility to rebuild, over time, both production and related structures.

When planning offshore settlements, particular attention must be given to optimizing the human environment in such areas as recreation, living conditions and services, since this is one of the basic means of compensation. The traditional solution to this problem, based on functional zoning, is of little use due to the lack of free space and the high cost of filled land. Probably, it would be more advisable to rethink the principle of functional zoning in favor of a broader and more flexible "functional integration." In some respects, this principle is illustrated in the functional structure of a dormitory complex. It must be developed along the lines of vertical integration, while not closing it off from the "service-recreation" spheres, but broadening it to include all areas of activity. Such a solution assumes a substantially denser and more complex space-time environment which will, first of all, meet the human need for complexity of spatial impressions and, secondly, significantly broaden the sphere of contact and make it easier for people to establish contact among one another.

The basic features of forming an offshore settlement infrastructure have been reviewed. The fact that it has been shown to be a continually developing system forces us to reconsider our design methods, most importantly, to make the time factor more significant. Many more time parameters must be considered than are presently being used in project development. There are obvious shortcomings in the way time is taken into account during the planning stages, in determining facility service life and in the sequencing of construction work. After all, time, especially in areas of initial development, is significantly active and can change or even nullify designs that have already been adopted. The time factor was especially significant in the construction of Chvanov Island. A complex of five-story dormitories was proposed to completely satisfy housing needs. The architectural plan was to make the complex a closed system, a "city-home" megastructure, equipped with all the necessary cultural and personal services. This approach excluded the possibility of future expansion of the complex and development of the living area. But the time factor quickly showed how unsound the forecasts were and made it necessary to expand the living area and organize, in the central part of Chvanov Island, a complete social and cultural atmosphere. The complex would be transformed from the nucleus into an element of that environment. The latest Gipromorneftegaz designs provide for a basic change in the social infrastructure of Chvanov Island by removing all industrial structures and creating residential, cultural, service, administrative and sports establishments and organizations. Here, time has directly created a new infrastructure. Predicting infrastructure growth would have made it possible to avoid much delay.

A retrospective analysis of the Neftyanyye Kamni settlement showed the systematic character of the offshore settlement built on the principles of interrelation and interdependence of the elements of the material-space environment. Specifying time as one of the decisive design factors made it necessary to determine typical time intervals which reflect the growth of the offshore community's infrastructure. Due to the difficult climatic and environmental conditions, the unusual nature of the habitat being developed and the lack of previous experience, the process of offshore town formation did not fit into the characteristic time intervals of dry-land development. Therefore, it had a number of unusual aspects, as a result of which the scientific preparation for development was incomplete and fragmented. Future oil field developments are still being clarified while the initial infrastructure is already being formed. Therefore, the first infrastructure development studies are devoid of a spatial-economic basis, which causes a disparity between them and the actual future developments. Three early stages of development--scientific-research, prospecting and initial infrastructure formation--which determine the future growth of the city, take place simultaneously here. Naturally, this makes the "learning curve" of the design less effective.

The second feature is that offshore settlements are group developments whose external ties with the base city and other parts of the network are predetermined to a great degree. Their infrastructure must be completely built up from nothing. This initially cannot be programmed--it is regulated and controlled by a multitude of conditions, decisions, plans, ideas and

circumstances. The practice of financing offshore settlement development "facility by facility," rather than as a unified whole, makes this even worse and leads to the formation of a fragmented infrastructure which varies with each stage of development. When construction volume is continually rising and, due to a number of special features of developing this type of environment, the infrastructure becomes temporary in nature, since the means used to build various structures, such as platforms, docks and settlements, are tied to present needs and are not oriented toward future development. It is lost from view that, in the initial development period, even a temporary structure has great value. The first workers at the site--geologists, drillers and construction workers--put facilities where it is easiest and most convenient for them. Therefore, the initial infrastructure does not foresee future developments, utilities and etc. Labor and resources go into the initial temporary infrastructure, which becomes the rigid framework of the future infrastructure.

In 1948, when the first landing party arrived at the lonely cliffs, no future oil field development plans had yet been made. Only the prospecting work remained to be done to determine the size of the field, which would determine its future development. However, the great distance from shore and from the material and technical base, and the absence of natural harbors for shipping, created highly unfavorable conditions for exploratory work. They needed first of all to build a breakwater, and artificial harbor and living and production facilities. All of this would require great expenditures. There was no guarantee that these would be recouped. This work also greatly delayed the production start-up.

In order to conduct drilling without building expensive breakwaters, old ships were sunk to form a harbor. Drilling mud mixers and other drilling equipment were installed on the decks of ships. The holds were used for mud storage and sometimes even for showing movies. The superstructure and cabins were divided into production, residential and storage facilities, cafeteria and stores. Therefore, the first infrastructure was created at minimum cost and, probably, economically well-based for that stage of development.

There is no doubting its temporary nature. However, the many complex and interrelated developmental processes made Chvanov Island the settlement center for a long time. It is no accident that the organization of the Neftyanyye Kamni residential zone is presently taking place on this island, named after one of the ships sunk in its harbor. In other words, one of the areas of the growing settlement, for a number of objective reasons, will become a starting point in its future development.

The specifics of offshore settlement infrastructure development must be reflected in a changed design strategy. First of all, settlement infrastructure development must proceed not according to an overall plan, but by a more flexible overall scheme designed to take into account growth trends. A similar approach to design must as fully as possible reflect the needs of

the growing settlement and allow the time factor to be more widely considered in improving forecast reliability. Besides, it assures planning control of infrastructure formation by selecting optimum growth conditions in each particular case.

The spatial structural elements must be strictly differentiated by service life and their creation must take into account the specifics of each offshore settlement. The proposed "functional integration" approach provides the most efficient use of territory. Through multiple-functionality of separate structural units, it creates the prerequisite for effective organization of the living area. Naturally, such an infrastructure cannot be built from traditional elements. Structural elements must be sufficiently mobil, convertible and adaptable to changing external conditions.

The Neftyanyye Kamni settlement example shows the conflict between an overly rigid infrastructure and the needs of production and living area development. Localizing the residential zone and organizing a single settlement center are based on the traditional methods of living space optimization which, for offshore communities, are insufficient and limited. Together with the positive factors--creation of a complex of residential, administrative and service, cultural and sports facilities--this method cannot exclude such shortcomings as pollution, large accessibility radii, constance of structure and inflexibility of volumes. Besides, even today there is a need for some dynamic movement in both the volume-spatial structure and the system of structural relationships. The present tendency of "outward creep" of the initial production units due to development and automation dictate the need to create mobile architectural elements.

The development of reservoirs deeper than 200 meters has greatly enlarged the offshore oil and gas area. The first steps toward creating mobile floating systems are being taken. These are the floating drill rigs "Baky," "Khazar," "Azerbaydzhan," "Kaspmorneft'," "Imeni 24th CPSU Congress," "Shel'f-1" and "Shel'f-2." These are "dynamic" systems and signify a transition to structureless offshore resource development, which is suited to the present stage of development. This, however, does not lessen the significance of structured cities such as Neftyanyye Kamni.

Developing new oil fields involves thousands of workers, the creation of new settlements and the formation of new communications. In other words, it is the process of forming a qualitatively new development infrastructure, although it is presently spontaneous and not well regulated. At the same time, the nature of offshore settlements as systems capable of self-regulation, implemented by the action of people, and the active role of the infrastructure cannot be doubted. All this has been shown in the development of the Neftyanyye Kamni settlement.

The development of offshore resources is a large-scale, long-term undertaking. If industrial development can take place by stages, then effective town



formation must start from scientific analysis, the study of similar developments and a scientifically based settlement system, all of which are based on general development schemes. This approach will produce a settlement system that ensures optimum living conditions and creates a base for intensive offshore resource development.

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